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ABSTRACT

Descriptions of Public Health Service (PHS) career opportunities for engineers are contained in this booklet. A brief description of career horizons and the organization of the U.S. Public Health Service precedes discussion of the following topics: (1) Brief descriptions of PHS engineering employment opportunities, grouped by principal areas of specialization, including research and development, teaching and training, technical consultation, regulatory enforcement, automatic data processing, design and construction, facility operation and maintenance, special assignments, and student employment; (2) Mission statements of agencies and programs employing engineers included in the areas of health services administration; center for disease control; food and drug administration; health resources administration; national institutes of health; and alcohol, drug abuse, and mental health administration; (3) Discussion of engineer utilization, employment systems, employee benefits, career development and training, and job application procedures. (TA)

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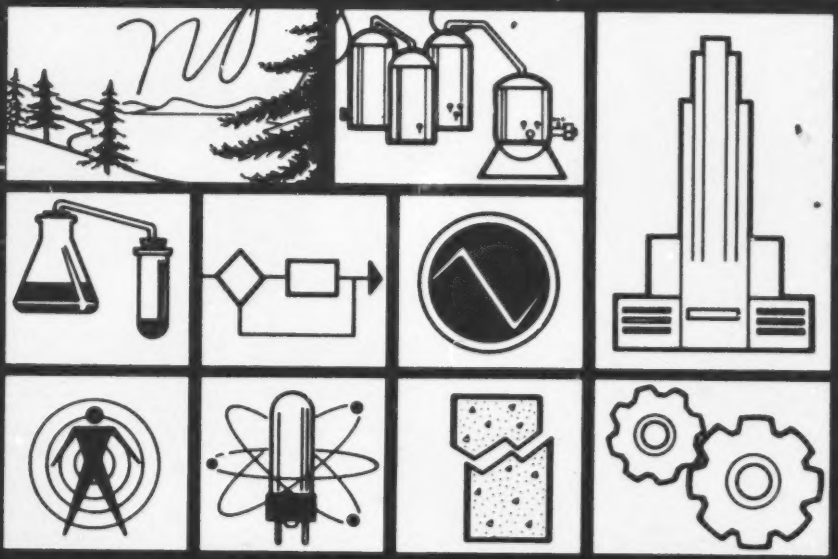
*An Invitation to Involvement:*

# ENGINEERING CAREER OPPORTUNITIES

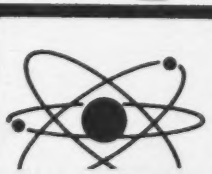
## in the U.S. Public Health Service

U.S. Department of Health, Education, and Welfare
Public Health Service



*--- A multidimensional experience in professional and personal development*

CIVIL/SANITARY • ENVIRONMENTAL • CHEMICAL • ARCHITECTURAL • SYSTEMS • NUCLEAR • MECHANICAL • ELECTRICAL • ELECTRONIC • INDUSTRIAL • BIOMEDICAL • MATERIALS •



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## INVITATION TO INVOLVEMENT

In this booklet you will find descriptions of Public Health Service career opportunities written by engineers for engineers. They represent a distillation of the views and experiences of many of us. Despite our best efforts, it has not been possible to adequately convey, in these few pages, the full range of opportunities and challenges that can be yours in the PHS. However, if we stimulate your interest, our purpose has been served. If you are looking for a "job", there are many available; if you want a career that is personally and professionally rewarding, the Public Health Service can meet your requirements.

We aren't seeking every career minded engineer. We're looking for a few of the best. If PHS career opportunities interest you and you think that you qualify, consider this your invitation to become involved. . . . as an engineer in the Public Health Service.

IAN K. BURGESS
CHIEF ENGINEER, U.S.P.H.S.

## CAREER HORIZONS

"A MULTIDIMENSIONAL EXPERIENCE IN PROFESSIONAL AND PERSONAL DEVELOPMENT IS IMPLICIT IN PUBLIC HEALTH SERVICE EMPLOYMENT"
As the principal health agency of the Federal Government, the PHS employs qualified engineers in virtually every engineering discipline and offers them assignments with a maximum potential for broad-based experience and professional advancement.

In the PHS you'll find the focus on YOU. While applying today's engineering knowledge and technology toward the solution of a myriad of health related problems, you will be afforded unique opportunities to achieve a direct and immediate impact on the health and well-being of your fellow man.

PHS employment opportunities exist principally at locations within the United States. They include assignments in:

- Basic laboratory research and development
- Field investigations and surveys
- Facilities design and construction
- Teaching
- Health planning and program development
- Consultation and program management

These activities are accomplished through direct (in-house) program operations or via technical assistance, contract, and grant programs.

Therefore, if the possibility of choosing among several unusual - often unique - opportunities to practice your profession, advance your career, and perform humanitarian service intrigues you, the distinctive engineering challenge offered by the United States Public Health Service should be of definite interest!

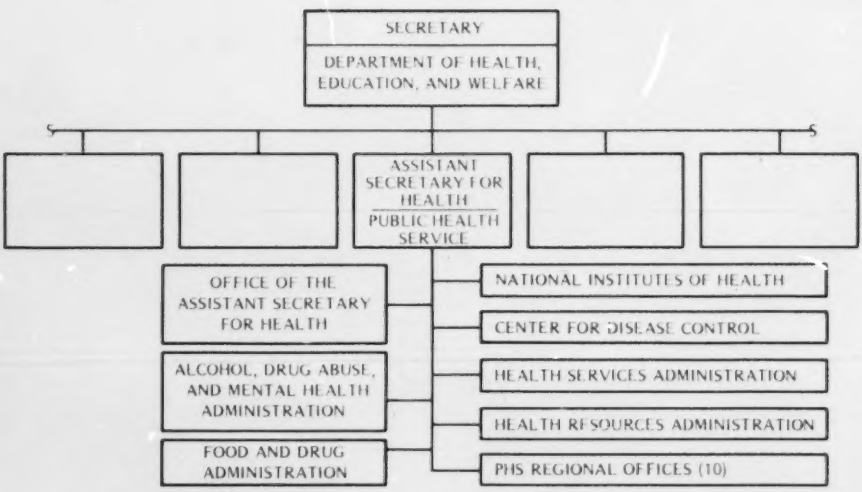
## THE U.S. PUBLIC HEALTH SERVICE

For over 175 years the Public Health Service has met its responsibilities for the medical and health protection of our nation.

The PHS is a principal operating component of the Department of Health, Education, and Welfare. Its Senior Executive, the Assistant Secretary for Health, is the principal advisor and assistant to the Secretary of HEW on national health policy and on all health-related activities in the Department.

The mission of the Public Health Service is to provide leadership in protecting- -and advancing- -the health of the nation, and in improving the organization and delivery of health services.

Organizationally, the PHS consists of the immediate Office of the Assistant Secretary for Health, six agencies, and ten regional offices. The largest proportion of engineering positions are located in program elements of the agencies.


SECRETARY
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
ASSISTANT SECRETARY FOR HEALTH
PUBLIC HEALTH SERVICE
OFFICE OF THE ASSISTANT SECRETARY FOR HEALTH
ALCOHOL, DRUG ABUSE, AND MENTAL HEALTH ADMINISTRATION
FOOD AND DRUG ADMINISTRATION
NATIONAL INSTITUTES OF HEALTH
CENTER FOR DISEASE CONTROL
HEALTH SERVICES ADMINISTRATION
HEALTH RESOURCES ADMINISTRATION
PHS REGIONAL OFFICES (10)

## CAREER OPPORTUNITIES

SPECIALTY . . . Brief descriptions of PHS engineering employment opportunities, grouped by principal areas of specialization (see below), appear on the following 18 pages.


Page No.

- ☐ Research and Development . . . . . 8
- ☐ Teaching and Training . . . . . 10
- ☐ Technical Consultation . . . . . 12
- ☐ Regulatory Enforcement . . . . . 14
- ☐ Automatic Data Processing . . . . . 16
- ☐ Design and Construction . . . . . 18
- ☐ Facility Operation and Maintenance . . . . . 20
- ☐ Special Assignments . . . . . 22
- ☐ Student Employment . . . . . 24


MISSION . . . A statement concisely describing the purpose of its existence has been prepared for each PHS program entity. The mission statements of agencies and programs employing engineers appear on pages 26 through 31.


Page No.

- ☐ Health Services Administration . . . . . 26
- ☐ Center for Disease Control . . . . . 27
- ☐ Food and Drug Administration . . . . . 28
- ☐ Health Resources Administration . . . . . 29
- ☐ National Institutes of Health . . . . . 30
- ☐ Alcohol, Drug Abuse, and Mental Health Administration . . . . . 31


INVOLVEMENT . . . Engineer utilization, employment systems, employee benefits, and job application procedures are briefly discussed in the concluding pages of this publication.


Page No.

- ☐ Engineer Utilization . . . . . 34
- ☐ Employment Systems . . . . . 36
- ☐ Qualifications and Pay . . . . . 38
- ☐ Career Development and Training . . . . . 39
- ☐ How to Apply . . . . . 40

## RESEARCH AND DEVELOPMENT

| AGENCY ➤ / CATEGORY ▼ | ADAMHA | CDC | FDA | HRA | HSA | NIH |
|---|---|---|---|---|---|---|
| ARCHITECTURAL | | | | | | |
| BIOMEDICAL | | ● | ● | | | ● |
| CHEMICAL | | ● | ● | | | ● |
| CIVIL/SANITARY | | ● | | | | |
| ELECTRICAL | | ● | ● | | | ● |
| ELECTRONIC | | ● | ● | | | ● |
| ENVIRONMENTAL | | | | | | |
| GENERAL | | ● | | | | |
| INDUSTRIAL | | ● | | | | |
| MATERIAL | | ● | ● | | | ● |
| MECHANICAL | | ● | ● | | | ● |
| NUCLEAR | | | ● | | | |
| SYSTEMS | | ● | ● | | | ● |

Public Health Service research and development programs are concentrated within three of its six agencies (CDC, FDA, and NIH). They are predominantly oriented toward either (1) device and equipment development or (2) standards and criteria development.

Most DEVICE AND EQUIPMENT DEVELOPMENT programs are conducted by NIH and are geared toward the production of specialized electronic and biochemical instrumentation for biomedical research, and toward the production of highly sophisticated devices for implantation and life support.

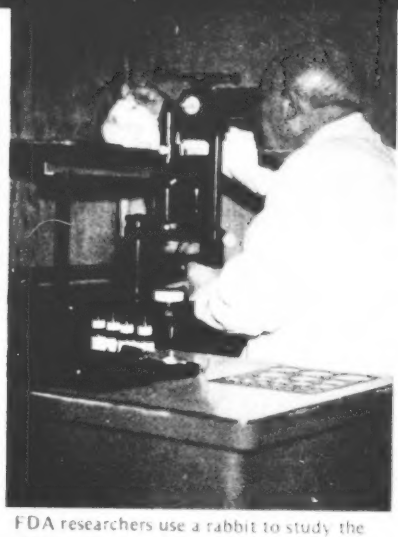
The majority of PHS engineers involved in research and development are associated with STANDARDS AND CRITERIA DEVELOPMENT programs. R&D projects being conducted by CDC and FDA for the purpose of developing standards and criteria include:

1. Studies centering on the effects of exposure to hazardous substances used in the workplace, with primary focus on such specific health and safety hazards as asbestos, beryllium, carbon monoxide, lead, mercury, noise pollution, heat stress, and others; research on the problem of coal workers' pneumoconiosis and other occupational respiratory diseases; and studies on the psychological, motivational, and behavioral factors involved in occupational safety and health.

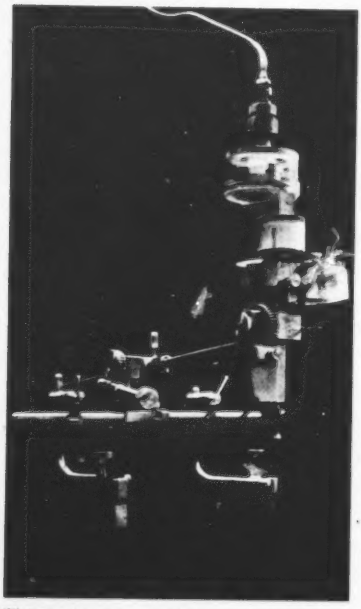
2. Studies centering on the health effects of radiation exposure; development/refinement of dosimetry measurement instrumentation; evaluation of hazards to the public health which may be caused by the use of medical devices and diagnostic products; and studies of food processing methods and equipment.

The PHS research and development engineer typically works as part of a multi-discipline team of highly trained engineers and scientists using ultra-sophisticated, modern equipment in an environment that fosters the free exchange of technical information with other researchers, agencies, and interested individuals/organizations.

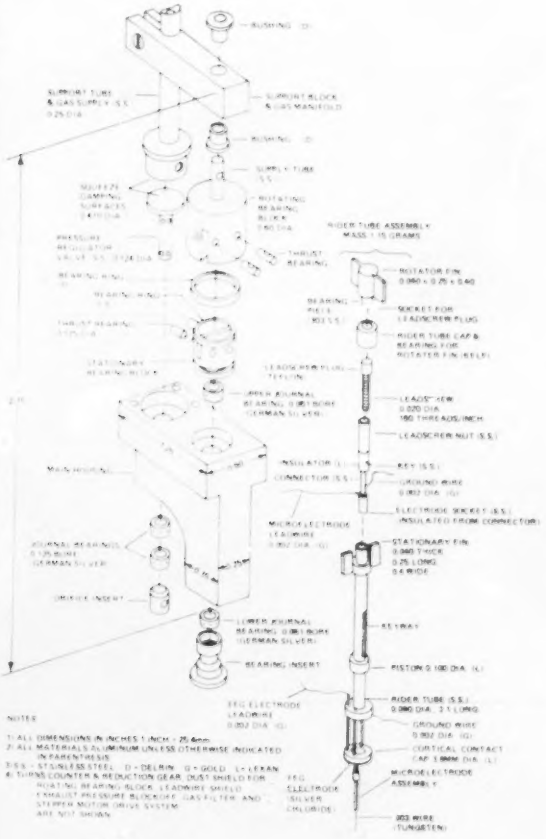
NIH has developed this portable device to monitor a patient's electrocardiagram using only fingertip contact. The information is transmitted over telephone lines to a medical facility for analysis.



FDA researchers use a rabbit to study the effects of microwaves on the lens of the eye which is believed to be especially susceptible to microwave damage.

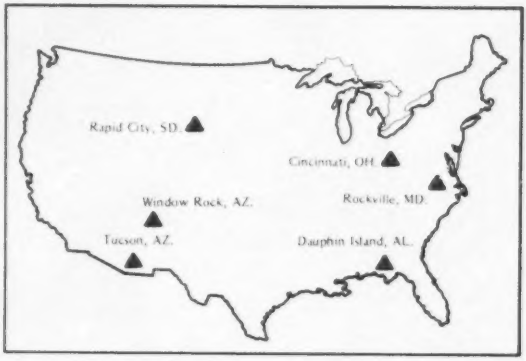


This instrument, called a gas bearing floating microdrive, was developed at NIH with the support of the Biomedical Engineering and Instrumentation Branch for the purpose of monitoring single cell electrical activity in the cortex. It has been successfully used during operations on human patients, and is being used to study the role of individual cells in the generation of epileptic seizures.


BUSHING
SUPPORT TUBE & GAS SUPPLY (S.S.) 0.25 DIA
SUPPORT BLOCK & GAS MANIFOLD
BUSHING
SUPPLY TUBE (S.S.)
SQUEEZE CAMMING SURFACES
ROTATING BEARING BLOCK
RIDER TUBE ASSEMBLY MASS: 1.15 GRAMS
PRESSURE REGULATION VALVE (S.S.)
THRUST BEARING
ROTATOR PIN 0.060 x 0.25 x 0.40
BEARING PLATE (S.S.)
SOCKET FOR LEADSCREW PLUG
RIDER TUBE CAP & BEARING FOR ROTATOR PIN (SAPPHIRE)
STATIONARY BEARING INSERT
LEADSCREW PLUG TEFLON
UPPER JOURNAL BEARING 0.061 BORE (GERMAN SILVER)
LEADS SCREW 0.020 DIA 160 THREADS/INCH
LEADSCREW NUT (S.S.)
MAIN HOUSING
INSULATOR (L)
KEY (S.S.)
CONNECTOR (S.S.)
GROUND WIRE 0.002 DIA (G)
ELECTRODE SOCKET (S.S.) INSULATED FROM CONNECTOR
MICROELECTRODE LEADWIRE 0.002 DIA (G)
JOURNAL BEARINGS 0.125 BORE (GERMAN SILVER)
STATIONARY PIN 0.060 TWICE 0.25 LONG 0.4 WIDE
BEARING INSERT
KEYWAY
LOWER JOURNAL BEARING 0.061 BORE (GERMAN SILVER)
BEARING INSERT
PISTON 0.100 DIA (L)
EEG ELECTRODE LEADWIRE 0.002 DIA (G)
RIDER TUBE (S.S.) 0.090 DIA 2.1 LONG
GROUND WIRE 0.002 DIA (G)
CORTICAL CONTACT CAP 1.8MM DIA (L)
MICROELECTRODE ASSEMBLY
EEG ELECTRODE (SILVER CHLORIDE)
.003 WIRE (TUNGSTEN)
NOTES
1. ALL DIMENSIONS IN INCHES 1 INCH = 25.4mm
2. ALL MATERIALS ALUMINUM UNLESS OTHERWISE INDICATED
3. SS = STAINLESS STEEL D = DELRIN G = GOLD L = LEXAN
4. SPINS COUNTER & REDUCTION GEAR, DUST SHIELD FOR ROTATING BEARING BLOCK, LEADWIRE SHIELD, SMALL PRESSURE REGULATOR, GAS FILTER, AND STEPPER MOTOR DRIVE SYSTEM ARE NOT SHOWN

## TEACHING AND TRAINING

| AGENCY ➤ / ▼ CATEGORY | ADAMHA | CDC | FDA | HRA | HSA | NIH |
|---|---|---|---|---|---|---|
| ARCHITECTURAL | | | | | | |
| BIOMEDICAL | | | | | | ● |
| CHEMICAL | | | ● | | | ● |
| CIVIL/SANITARY | | ● | ● | | ● | |
| ELECTRICAL | | | | | | |
| ELECTRONIC | | | | | | |
| ENVIRONMENTAL | | ● | ● | | ● | |
| GENERAL | | ● | | | | |
| INDUSTRIAL | | | | | | |
| MATERIAL | | | | | | |
| MECHANICAL | | ● | ● | | | |
| NUCLEAR | | | | | | ● |
| SYSTEMS | | | | | | ● |




Depending on program needs, engineering oriented intramural teaching and training activities are conducted periodically within each of the six PHS agencies. Most scheduled extramural teaching and training programs are conducted by three agencies (CDC, FDA, and HSA) for the benefit of local, State, other Federal, and non-Government personnel. Civil, environmental, and general engineers are often engaged as training specialists. However, depending on the subject being covered, representatives of virtually any engineering category may be found on any given training staff.

Characteristic extramural teaching and training endeavors carried out by PHS engineering programs include:

1. Training in the field of occupational safety and health. Short-term courses are held to train U.S. Department of Labor plant inspectors, employees, employers, labor unions, and qualified personnel engaged in the field of occupational safety and health. Training courses presented are advanced professional courses.

2. Training of Federal, State, and local health agency personnel on methods for surveying radiation-producing equipment; training of physicians, x-ray machine operators, and other professional and paraprofessional personnel with responsibility for operating radiation-producing equipment.

3. Training in the operation and maintenance of water supply and waste disposal facilities constructed for Indians and Alaska Natives by the Indian Health Service. Such training is conducted routinely, on a continuing basis, locally and at specially designed training centers. Community health representatives (who are Indian and Alaska Native people) are trained by the Indian Health Service in basic public health concepts, including environmental sanitation, at several regional training centers. Environmental, civil, and sanitary engineers conduct appropriate course segments and participate in course design and direction

IHS field and design engineers listen to a lecture on the electrical performance characteristics of water pumps presented by a member of the IHS training staff.

FDA engineers train x-ray equipment inspectors for Federal, State, and local health departments. Here an engineer points out the localizing light beam which indicates the area which will be exposed to x-rays.

NIH routinely conducts in-house training sessions on programing and operation of its many computer systems.

All NIH researchers who work with radioactive materials are required to attend Radiation Safety Branch sponsored classes covering proper handling techniques and the use of instruments to measure radioactivity.

## TECHNICAL CONSULTATION

| AGENCY ➤ / CATEGORY ▼ | ADAMHA | CDC | FDA | HRA | HSA | NIH |
|---|---|---|---|---|---|---|
| ARCHITECTURAL | | | | ● | ● | |
| BIOMEDICAL | | | ● | | | ● |
| CHEMICAL | | | ● | | | ● |
| CIVIL/SANITARY | | ● | | ● | ● | ● |
| ELECTRICAL | | ● | ● | | | ● |
| ELECTRONIC | | | ● | | | ● |
| ENVIRONMENTAL | | ● | ● | | ● | ● |
| GENERAL | | ● | | | | |
| INDUSTRIAL | | | | | | |
| MATERIAL | | | | | | |
| MECHANICAL | | ● | ● | | | ● |
| NUCLEAR | | | ● | | | ● |
| SYSTEMS | | | | | | |

▲ DHEW REGIONAL OFFICES
■ PHS PROGRAM OFFICES

PHS engineering personnel routinely function as technical consultants to two distinctly different groups of clientele.

1. As members of internal study groups, standards/criteria development bodies, and research teams, PHS engineers interface with medical and scientific associates to provide advice and assistance on problems related to their areas of expertise.

2. As representatives of the PHS to other Federal, State, and local government agencies and to private individuals, groups, and industries, PHS engineers regularly provide technical consultation and assistance in the specific program areas to which they are assigned.

Representatives of virtually all engineering categories serve as PHS technical consultants. Consultants may be assigned to almost any geographical location. Within the United States, many PHS program consultants, who routinely work with non-PHS agencies/organizations, are assigned to one of the ten DHEW regional offices or to State health departments. Assignment as a technical consultant outside the PHS typically involves such activities as:

1. Providing assistance to Federal, State, local and industrial occupational safety and health programs in the use of engineering methods for evaluation of occupational safety and health problems.

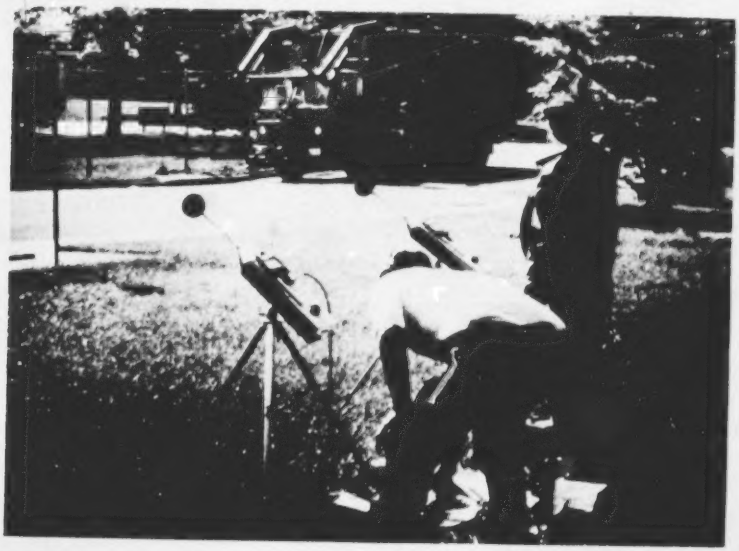
2. Providing assistance and advice to State and local regulatory agencies and industry in the conduct of surveys of shellfish growing waters, and participating in investigations of shellfish harvesting and processing techniques.

3. Providing assistance and advice to State and local regulatory agencies and to industry in testing radiation hazards of television receivers, microwave ovens, lasers, and diagnostic x-ray products.

4. Providing assistance and advice to territorial governments in evaluating public health problems and in developing and implementing corrective actions.

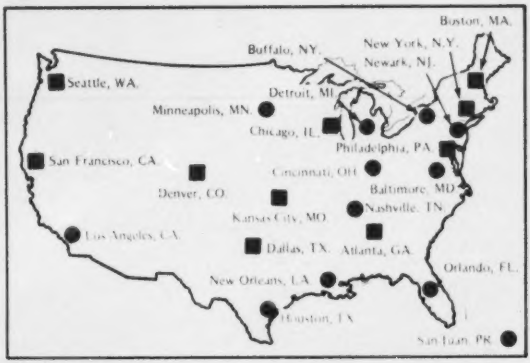
A senior mechanical engineer (center) is shown clarifying ductwork installation details for the project engineers responsible for inspecting ongoing construction.

Preparation of the Environmental Impact Statement covering construction of a new incinerator at NIH required development of background data covering all aspects of the proposed construction. PHS engineers brought in as consultants to the EIS writer are shown monitoring the noise level generated by operation of a refuse collection vehicle.



## REGULATORY ENFORCEMENT

| AGENCY ➤ / ▼ CATEGORY | ADAMHA | CDC | FDA | HRA | HSA | NIH |
|---|---|---|---|---|---|---|
| ARCHITECTURAL | | | | | | |
| BIOMEDICAL | | | ● | | | |
| CHEMICAL | | | ● | | | |
| CIVIL/SANITARY | | | ● | | | |
| ELECTRICAL | | | ● | | | |
| ELECTRONIC | | | ● | | | |
| ENVIRONMENTAL | | | ● | | | |
| GENERAL | | | ● | | | |
| INDUSTRIAL | | | ● | | | |
| MATERIAL | | | ● | | | |
| MECHANICAL | | | ● | | | |
| NUCLEAR | | | ● | | | |
| SYSTEMS | | | ● | | | |




● FDA DISTRICT OFFICE

■ DHEW REGIONAL OFFICE, AND FDA REGIONAL AND DISTRICT OFFICES

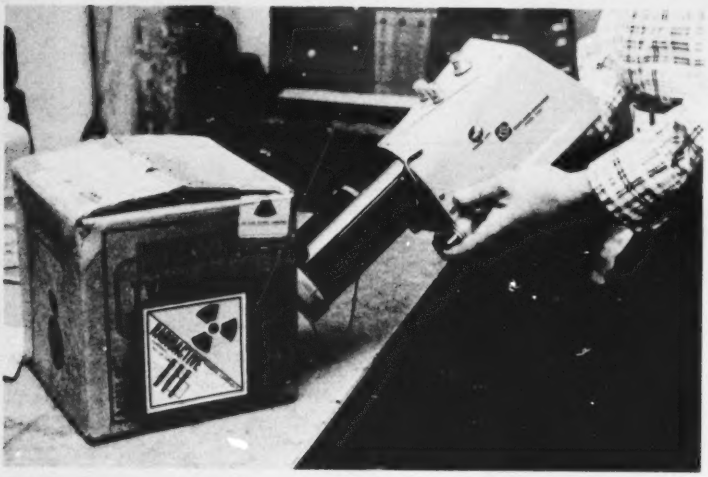
Engineering personnel are directly involved in the implementation of several PHS regulatory enforcement programs, most particularly those conducted by two bureaus of the Food and Drug Administration; i.e., the Bureau of Medical Devices and Diagnostic Products and the Bureau of Radiological Health. The engineering staff of these two bureaus develop, plan, coordinate, conduct, and evaluate surveillance and compliance programs relating to medical devices, diagnostic products, and electronic products which emit harmful or unnecessary electromagnetic radiation. Engineers working in district offices perform on-site inspections and evaluations of complex equipment and processes used by regulated industries.

The duties and responsibilities listed below are typical of those assigned to engineers associated with regulatory enforcement programs:

1. Develop (and evaluate the adequacy of) safety and performance standards, criteria, and test methods.
2. Conduct survey and compliance programs; i.e., establish safety performance standards, review manufacturers quality control and testing programs, test products for compliance with Federal requirements, and visit manufacturing plants.
3. Participate in plant and user site inspections and investigations, and make recommendations for legal action.

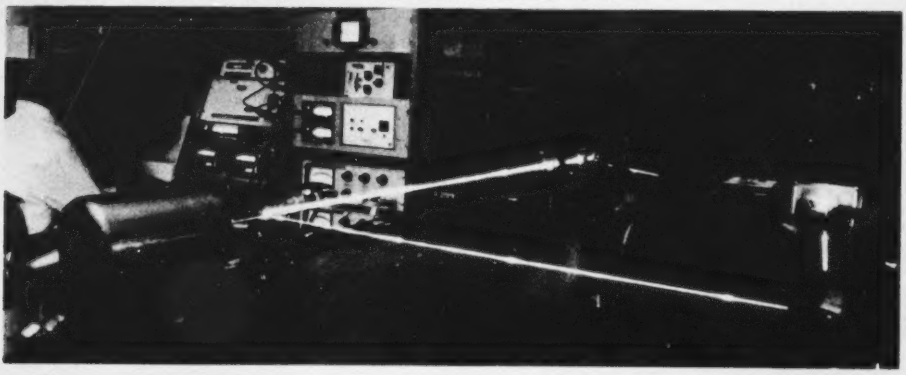
Examples of projects with which various engineer specialists are typically involved include the:

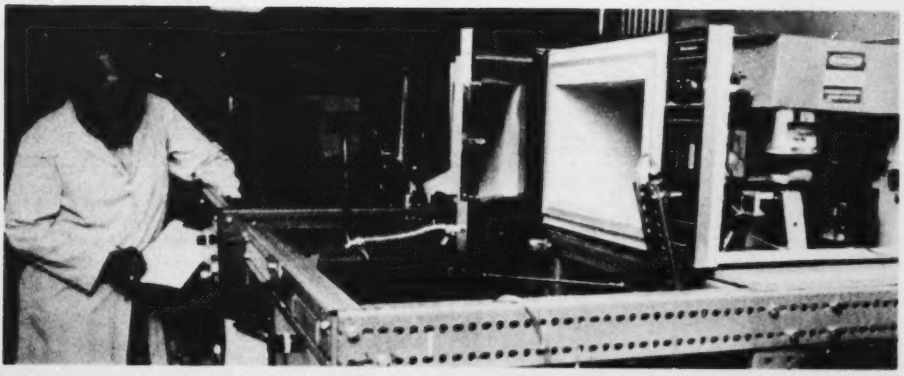
1. Engineering analyses of electronic cardiac inversion hospital equipment, motor-operated respiratory ventilator equipment, and electro-mechanical life-support equipment.
2. Examination of dye-testing techniques used in leak-testing sealed ampules of an injectable drug.
3. Certification of diagnostic x-ray equipment, television receivers, microwave ovens, lasers, and airport baggage inspection systems.
4. Evaluation of the adequacy of processes, equipment, and packaging used for canning foods.



Radiation safety officer checks radioactive materials shipment for contamination upon receipt from manufacturer.

This FDA experimental laboratory is the focal point of efforts to test laser products and evaluate instrumentation for measuring laser emissions. Using a computerized system, the engineer shown here calibrates a reference instrument using a National Bureau of Standards calorimeter.

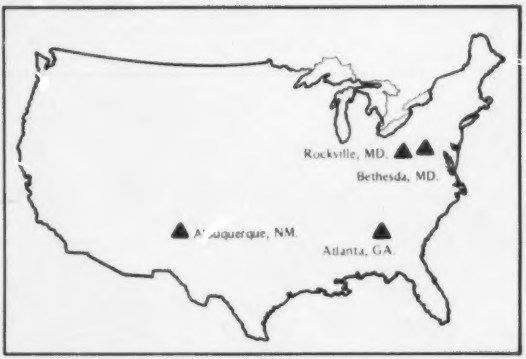




Microwave ovens undergo life testing at FDA's Winchester Engineering and Analytical Center, Winchester, Massachusetts. Mechanical test rig turns oven on, opens the door and thus activates interlocks to shut the oven off, closes the door, then repeats the cycle.

## AUTOMATIC DATA PROCESSING

| AGENCY ➤ / ▼ CATEGORY | ADAMHA | CDC | FDA | HRA | HSA | NIH |
|---|---|---|---|---|---|---|
| ARCHITECTURAL | | | | | | |
| BIOMEDICAL | | | | | | |
| CHEMICAL | | | | | | |
| CIVIL/SANITARY | | | | | | |
| ELECTRICAL | ● | ● | ● | ● | ● | ● |
| ELECTRONIC | ● | ● | ● | ● | ● | ● |
| ENVIRONMENTAL | | | | | | |
| GENERAL | | | | | | |
| INDUSTRIAL | | | | | | |
| MATERIAL | | | | | | |
| MECHANICAL | | | | | | |
| NUCLEAR | | | | | | |
| SYSTEMS | ● | ● | ● | ● | ● | ● |

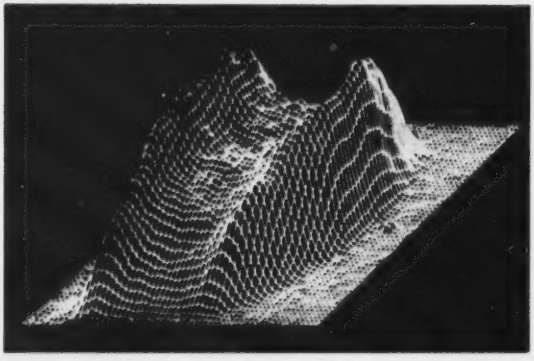



The application of automatic data processing technology is fundamental to the planning and execution of virtually every Public Health Service program. All of the health agencies and their major program components conduct data processing functions of widely varying magnitude and complexity. Most headquarters, regional, district, field, and laboratory installations regularly utilize the extensive capabilities of the principal Public Health Service computer facilities located in Rockville and Bethesda, Maryland. In addition, many field and laboratory installations have mini-computer systems available to support experimental research and administrative activities. The Public Health Service professional is provided such automatic data processing support as required to accomplish his program mission.

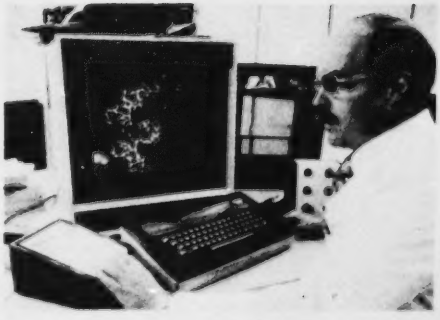
Due to the variety of data processing workloads, the Public Health Service employs personnel with widely diverse educational backgrounds and experience. These personnel perform the full gamut of data processing activities, from straightforward data input and retrieval to sophisticated computer analyses associated with operations research programs.

Historically, Public Health Service requirements for career personnel in the field of automatic data processing have been satisfied by recruitment of graduates in the mathematical sciences fields. More recently, however, significantly greater numbers of engineers graduate with backgrounds heavily weighted in the field of data processing. Thus, the role of the engineer as a data processing specialist is assuming ever increasing importance and becoming a major engineering activity in the Public Health Service. Most commonly, data processing engineers have electrical, electronic, or systems engineering degrees. Engineers trained in other engineering fields who have supplemented their basic education with graduate study and experience in the data processing and systems engineering fields are also employed as data processing specialists.

Scanning microdensitometer (right) with minicomputer (left) is used by the Division of Electronic Products, FDA, to study modulation transfer functions of x-ray tube focal spots.



Sample intensity distribution of an x-ray tube focal spot scanned with microdensitometer-computer system. Scan shows lack of uniformity of focal spot intensity, which can contribute to poor quality x-ray film.



An engineer inspects the product of a mathematical model of a protein molecule developed through the Division of Computer Research and Technology, NIH. The model is three-dimensional and, with computer control, may be rotated to examine all sides.

## DESIGN AND CONSTRUCTION

| AGENCY ➤ / ▼ CATEGORY | ADAMHA | CDC | FDA | HRA | IHSA | NIH |
|---|---|---|---|---|---|---|
| ARCHITECTURAL | | | | | | ● |
| BIOMEDICAL | | | | | | |
| CHEMICAL | | | | | | |
| CIVIL/SANITARY | | | | | ● | ● |
| ELECTRICAL | | | | | ● | ● |
| ELECTRONIC | | | | | | |
| ENVIRONMENTAL | | | | | ● | |
| GENERAL | | | | | ● | ● |
| INDUSTRIAL | | | | | | ● |
| MATERIAL | | | | | | |
| MECHANICAL | | | | | ● | ● |
| NUCLEAR | | | | | | |
| SYSTEMS | | | | | | ● |

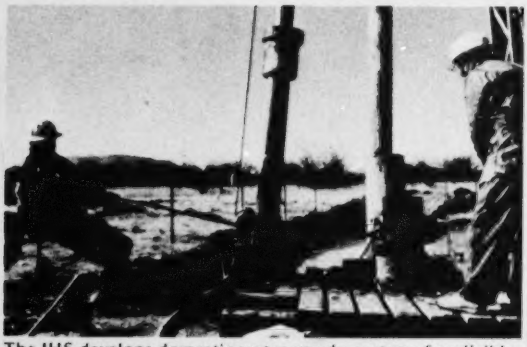
More than twenty-five percent of all engineer personnel currently employed by the Public Health Service are engaged in health facilities design and construction. Public Health Service engineers shoulder primary responsibility for such diverse activities as design (including specification, plan, and contract document preparation) and construction of:

1. Individual home water supply and wastewater disposal systems,
2. community potable water supply, treatment, storage, and distribution systems,
3. community wastewater collection and treatment systems,
4. health care facilities structures, and
5. sophisticated and specialized research and medical care complexes.

Nearly three-quarters of the PHS engineers engaged in the design and construction activity are assigned to the sanitation facilities construction program of the Indian Health Service (IHS). Their efforts, directed toward improving the environmental conditions under which American Indians and Alaska Natives live, are expended on reservations and in communities located principally west of the Mississippi River. IHS engineers function as part of a coordinated environmental health team working directly with the Indian people. Typically, IHS engineers are involved in every phase of project development and implementation from preliminary field reconnaissance, through actual design and on-site construction supervision, to operation and maintenance training for users of completed systems.

PHS engineers are also engaged in planning, design, construction, alteration, and management of the Federal health facility physical plant. Intramural research, direct medical care, training, and administrative activities are conducted in over 2,100 PHS-owned buildings located throughout the United States. Sizeable, multi-discipline engineering team efforts in this area are established at the National Institutes of Health, in the Indian Health Service, and in the Office of Facilities Engineering and Property Management, DHEW.

The final stages of construction of a new biohazard incineration system are carefully monitored by the project engineer.



The IHS develops domestic water supply systems for eligible American Indian and Alaska Native houses and communities using equipment such as this cable tool percussion drilling rig.

A specially fabricated spirally-wound wire reinforced flexible pipeline designed to convey potable water across the floor of an Alaskan inlet is assembled on shore in preparation for installation by the IHS.

An IHS engineer conducts a field test of the quality of water obtained from a recently drilled well.

## FACILITY OPERATION AND MAINTENANCE

| AGENCY ➤ / CATEGORY ▼ | ADAMHA | CDC | FDA | HRA | HSA | NIH |
|---|---|---|---|---|---|---|
| ARCHITECTURAL | ● | | | | | |
| BIOMEDICAL | | | | | | |
| CHEMICAL | | | | | | |
| CIVIL/SANITARY | ● | ● | ● | | ● | ● |
| ELECTRICAL | ● | ● | ● | | ● | ● |
| ELECTRONIC | | | | | | |
| ENVIRONMENTAL | ● | ● | ● | | ● | ● |
| GENERAL | | | | | ● | ● |
| INDUSTRIAL | | | | | | ● |
| MATERIAL | | | | | | |
| MECHANICAL | ● | ● | ● | | ● | ● |
| NUCLEAR | | | | | | ● |
| SYSTEMS | | | | | | ● |

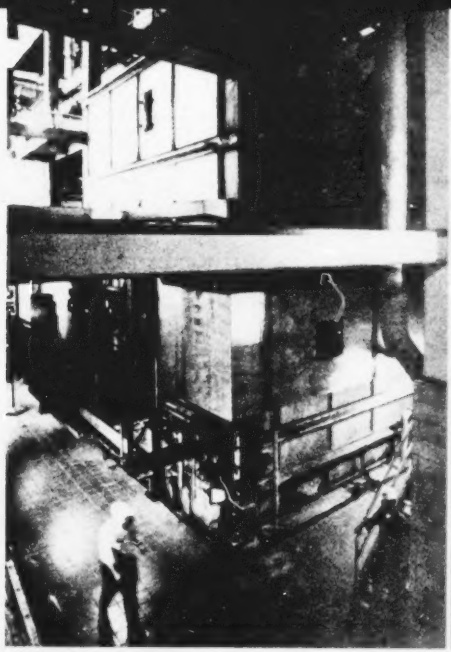
Intramural research, direct medical care, training, and administrative activities are conducted by Public Health Service agencies in over 2,100 owned and nearly 500 leased buildings located throughout the United States. At many locations sizeable numbers of buildings are grouped together into research complexes (Center for Disease Control, National Institutes of Health, etc.) and into direct medical care complexes (Public Health Service Hospitals, Indian Health Service Hospitals, etc.). Each individual building and/or complex has its standard operation and maintenance needs which are usually compounded by peculiar requirements and problems related to the mission of the occupying program.

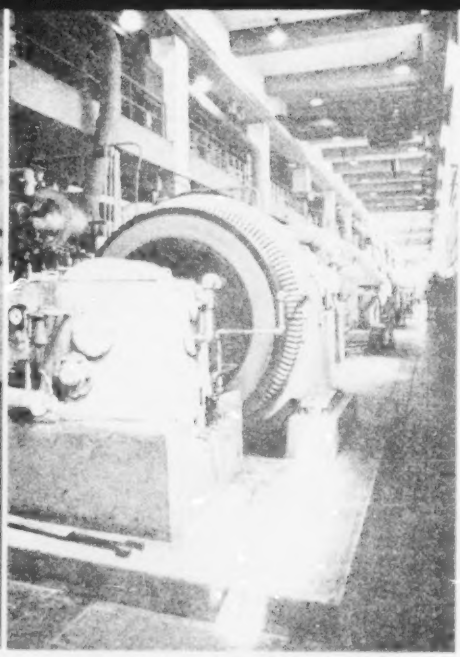
Engineering personnel operating Public Health Service facilities develop, manage, and coordinate operation and maintenance programs. These programs are aimed at solving environmental, structural, electrical, and mechanical problems peculiar to facilities designed and/or utilized for specialized research, direct medical care, and many other, often unique, PHS activities. Coordination with physicians, scientists, and program administrators is required to assure provision of a safe environment conducive to high quality program performance.

Typical Public Health Service engineering programs include provisions for handling such concerns as:

1. Biohazard and contamination control,
2. Industrial hygiene,
3. Hospital sanitation,
4. Sanitary engineering,
5. Environmental studies,
6. Training, and
7. The traditional structural, electrical, and mechanical aspects common to all facilities engineering programs.

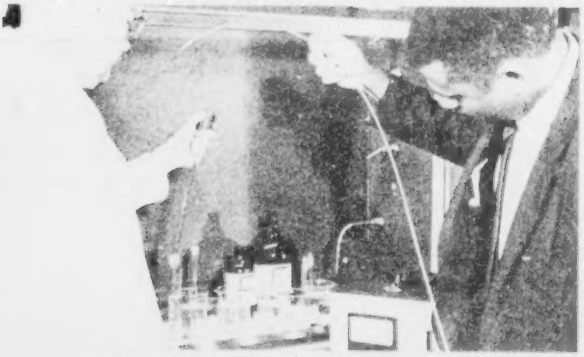
A health physicist in the Radiation Safety Branch tests air samples for the presence of gaseous radioactive iodine. This branch employs life sciences oriented nuclear engineers to design and build equipment for safely handling radioactive tracers which are vital to research at NIH.





The main power plant building at NIH houses the steam boilers (left) and a compressed water chiller galleries (right). The many activities in the NIH complex require the continuing attention of engineers to their environmental control and other complex mechanical systems.

An NIH mechanical engineer monitors the performance of a newly installed chilled water unit.



An NIH environmental engineer evaluates the performance of a laboratory fume hood.

## SPECIAL ASSIGNMENTS OUTSIDE THE PUBLIC HEALTH SERVICE

| AGENCY ➤ / CATEGORY ▼ | ADAMHA | CDC | FDA | HRA | HSA | NIH |
|---|---|---|---|---|---|---|
| ARCHITECTURAL | | | | | | |
| BIOMEDICAL | | ● | ● | | | ● |
| CHEMICAL | | ● | ● | | | |
| CIVIL/SANITARY | | ● | ● | | ● | |
| ELECTRICAL | | | | | | |
| ELECTRONIC | | ● | | | | |
| ENVIRONMENTAL | | ● | ● | | ● | |
| GENERAL | | ● | ● | | ● | |
| INDUSTRIAL | | ● | | | | |
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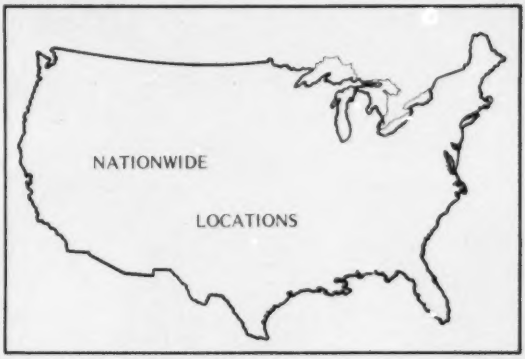



Public Health Service engineers may be "loaned" for relatively short periods of time to other Federal agencies; territorial, state, and local governments; international health organizations; and foreign governments UPON THE REQUEST of such agency, organization, or government.

In most instances, detailed engineers are assigned as Public Health engineering program consultants and/or advisors and hence must be senior staff personnel eminently experienced in their field. However, the assignment of significant numbers of entrance level commissioned officer engineers to operating programs of the Environmental Protection Agency has occurred in the past.

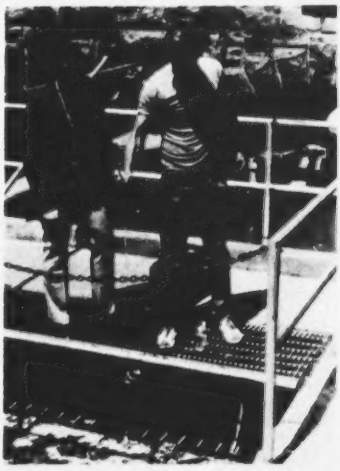
Engineering personnel assigned to the Environmental Protection Agency constitute, numerically, the largest single body of PHS engineers assigned to any non-PHS program. They occupy positions in most EPA technical programs and are assigned to field, research, and administrative offices nationwide.

The Public Health Service also regularly assigns a small number of experienced engineers as Public Health Sanitary Engineering Consultants to the National Park Service and to the U.S. Coast Guard. Numerous other organizations and agencies (e.g., the Consumer Product Safety Commission, the Council on Environmental Quality, World Health Organization, Agency for International Development, National Oceanic and Atmospheric Administration, Maritime Administration) have requested the assignment of PHS personnel to their program activities. Such requests are considered in light of their potential beneficial effect on national health goals and are honored contingent on the availability of suitable PHS personnel.

This PHS sanitary engineering officer and a Coast Guard construction crew foreman confer during installation of an oil-water separation system designed to process vessel bilge water. Senior PHS engineers are working with Coast Guard personnel to maintain safe, healthful, and environmentally acceptable conditions throughout the Coast Guard.

This solid waste conversion pilot plant has been constructed for the purpose of demonstrating the practicality of converting municipal solid waste into a fuel which can supplement coal in the generation of electric power. PHS engineers on detail to the Environmental Protection Agency have made significant contributions toward the advancement of solid waste management technology.

The PHS sanitary engineer shown here conducting a routine inspection, is a representative of an EPA regional water hygiene program. He is observing the raw water sampling procedure used by an employee of a large municipal water treatment plant.



## OPPORTUNITIES FOR EMPLOYMENT DURING "FREE TIME" PERIODS OF THE ACADEMIC YEAR

### CIVIL SERVICE SUMMER EMPLOYMENT PROGRAM

The Public Health Service employs a limited number of engineers each summer, at the GS-5 salary level and above, under the Civil Service Summer Employment Program. Applicants must be college graduates or graduate students. Engineering assignments fall into two major professional disciplines: (1) Medical Research, and (2) Health Administration. Selectees are provided opportunities to become familiar with PHS programs and to consider specific professional careers in the PHS.

Application filing deadlines are established each year, usually early spring (April 15), and are announced in Civil Service Commission Announcement No. 414. Civil Service Commission area office supplements may also be issued. Employment application is made by sending a Personal Qualifications Statement (SF-171) and a CSC Form 226, or college transcript, to the address designated in the pertinent announcement/supplement.

Announcements, supplements, and additional information are available from many college placement offices and any CSC area office or Federal Job Information Center.

### COMMISSIONED OFFICER STUDENT TRAINING AND EXTERN PROGRAM (COSTEP)

Through the Public Health Service COSTEP program, a limited number of eligible and qualified undergraduate/graduate students engaged in health-related studies are commissioned as reserve officers in the corps and are called to active duty for limited tours during the "free time" period of their academic year. The COSTEP experience offers participants an excellent opportunity to further their professional training and to become familiar with PHS career opportunities. For engineers, the varied programs and activities of the PHS offer a wide variety of training opportunities to students who have completed a minimum of three years of a Baccalaureate program, prior to assignment, and who plan to return to college after their COSTEP tour.

Selection is highly competitive, depending principally on qualifications, availability of assignments, and timing. COSTEP officers are entitled to pay and privileges equivalent to those of a Navy Ensign. To qualify for the COSTEP program, applicants must be: (1) U.S. citizens, (2) physically qualified, and (3) students in, or graduates of, a curriculum approved by the Engineers Council for Professional Development. Applicants cannot be members of any other uniformed service. Applications for employment between May and August must be received by February 1. Additional information and instructions can be found in CCPM Pamphlet No. 9, which can be obtained from the Office of Personnel Management by completing an information request card (inside the back cover).

## HEALTH SERVICES ADMINISTRATION (HSA)

Provides a national focus for programs and health services for all people of the United States with emphasis on achieving the integration of service delivery and public and private financing systems to assure their responsiveness to the needs of individuals and families in all levels of society.

Engineering opportunities in the Health Services Administration include those in the:

A. INDIAN HEALTH SERVICE. . . . .

The Indian Health Service assures a comprehensive health services delivery system for American Indians and Alaska Natives. Its goal is to raise the health level of the Indian and Alaska Native people to the highest possible level. To attain this goal the IHS strives (1) to assist Indian tribes to man and manage their health programs, (2) to act as the Indian and Alaska Native advocate in the health field (to generate other available interests and resources), and (3) to deliver the best possible comprehensive health services and develop or improve community and individual water and sanitation facilities, solid waste collection, and other environmental factors affecting health.

B. BUREAU OF MEDICAL SERVICES . . . . . .

The Bureau of Medical Services provides direct health care services, and support for such services, to certain legal beneficiaries of the Public Health Service. In carrying out this responsibility the bureau directs the activities of two divisions which employ engineers, (1) the Division of Hospitals (operates PHS hospitals and outpatient clinics for the benefit of authorized beneficiaries), and (2) the Division of Coast Guard Medical Services (develops and directs a comprehensive medical program for military personnel of the Coast Guard).

## CENTER FOR DISEASE CONTROL (CDC)

Provides leadership and direction to programs and activities designed to improve the health of the people of the United States by preventing or controlling diseases, improving laboratory performance, and assuring safe and healthful working conditions for this country's labor force.

Engineering opportunities in the Center for Disease Control include those in the:

### A. NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH . . .

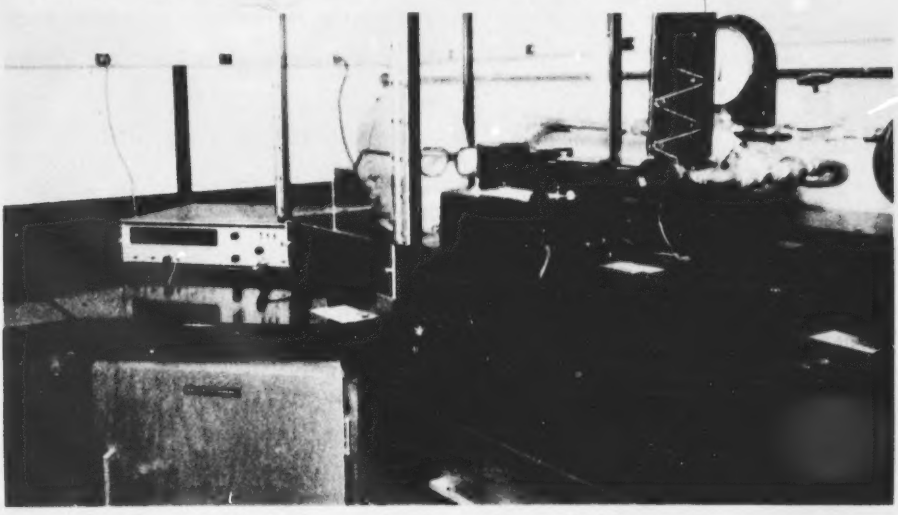
This institute plans, directs, and coordinates the National program effort (1) to develop and establish recommended occupational safety and health standards and (2) to conduct research, training, and related activities to assure safe and healthful working conditions for every working man and woman.

### B. BUREAU OF STATE SERVICES, ENVIRONMENTAL HEALTH SERVICES DIVISION . . . . . .

Among other responsibilities, this division conducts research, investigations, demonstrations, and programs directed toward the control of environmentally induced human health problems; assists states and local governments in the development of manpower, training programs and other services to deal with preventable conditions; and maintains liaison with, and provides advice and assistance to other Federal agencies and to international health organizations and other outside groups on human health problems associated with environmental factors.

Working through State health and environmental control agencies, the EHSD assists neighborhood and major metropolitan areas carry on a major effort aimed at the eradication and control of the menacing and dangerous rat.

The National Institute for Occupational Safety and Health tests protective eyeglasses by placing them in front of an air gun, which fires 22 calibre pellets into the lens at speeds up to 300 feet per second.



## FOOD AND DRUG ADMINISTRATION (FDA)

Endeavors to protect the public health of the Nation as it may be impaired by foods, drugs, biological products, cosmetics, medical devices, ionizing and non-ionizing radiation-emitting products and substances, poisons, pesticides, and food additives. FDA's regulatory functions are geared to insure that: (1) Foods are safe, pure, and wholesome; (2) drugs, medical devices, and biological products are safe and effective; (3) cosmetics are harmless; (4) all of the above are honestly and informatively packaged; and (5) exposure to potentially injurious radiation is minimized.

Engineering opportunities in the FDA include those in the:

### A. BUREAU OF MEDICAL DEVICES AND DIAGNOSTIC PRODUCTS . . . .

Among other responsibilities, conducts research, and coordinates the development of standards which identify criteria for the materials used and the performance, sensitivity, accuracy, safety, and durability (among other elements relevant to safety and performance) of medical devices and diagnostic products; collects and evaluates data on significant hazards to the public health which may be caused by the use of medical devices and diagnostic products; assembles extramural panels of experts (1) to study the developmental, manufacturing, and application aspects of medical devices and diagnostic products and (2) to classify these products based on degree of potential hazard to human health; reviews existing and develops new test procedures for evaluating the safety and efficacy of medical devices; and analyzes the material and engineering design features of medical devices to ensure compliance with existing safety and performance requirements.

### B. BUREAU OF FOODS, DIVISION OF FOOD TECHNOLOGY . . . . . .

Among other responsibilities, develops, evaluates, and drafts the substantive content, including technological and engineering specifications, of current good manufacturing practices, model ordinances and codes, model regulations and amendments thereto; and administers cooperative Federal-State shellfish and milk certification programs.

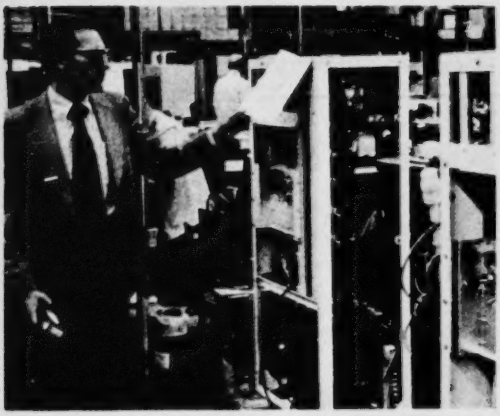
### C. BUREAU OF RADIOLOGICAL HEALTH . . . . . .

Among other responsibilities, develops and implements a national program through promulgation of regulatory and voluntary standards to limit unnecessary exposure of the population to potentially hazardous radiation, and assures that radiation is used safely and efficaciously; among manufacturers of electronic products, enforces compliance with Federal radiation performance standards; conducts survey and compliance programs related to radiation emission; conducts and supports research on the health effects of radiation exposure; develops criteria, recommendations, and standards related to radiation use and exposure; develops and promotes improved procedures, techniques, and user qualifications for reducing unnecessary radiation exposure; provides technical and scientific support, including training, to other bureaus within FDA and to other agencies having radiological health responsibilities.

### D. OFFICE OF THE EXECUTIVE DIRECTOR OF REGIONAL OPERATIONS . . . . . .

Directs the FDA field force which inspects foods, drugs, cosmetics, medical devices, and other health related products; conducts a broad range of programs in consumer and industry education covering all facets of FDA activities.

Among the special studies conducted by the Shellfish Sanitation Technical Service Units of FDA is one geared toward identifying ways to naturally purify polluted shellfish such as these. PHS engineers play a major role in the design of the purification systems being studied.



A Bureau of Radiological Health engineer conducts an in-plant inspection to review quality control procedures used to insure the safety of diagnostic x-ray equipment.

## HEALTH RESOURCES ADMINISTRATION (HRA)

Provides leadership with respect to the identification, deployment, and utilization of personnel, educational, physical, financial, and organizational resources in the achievement of optimal health services for the people of the United States.

Engineering opportunities in the HRA are limited. A small number of engineers are employed with the Architectural and Engineering Design and Equipment Branch of the Division of Facilities Development, Office of Program Support, Bureau of Health Planning and Resources Development.

Among other responsibilities, the Division of Facilities Development provides leadership in the architectural, engineering and equipment aspects of the health facilities construction program; conducts studies on design and construction requirements; and maintains liaison with State hospital associations and other professional organizations concerned with the design, construction, and equipping of health facilities.

This division administers the National Civilian Health Facilities Construction and Modernization Program, popularly known as the "Hill-Burton" Program.

Hospital design criteria developed by DFD are used extensively by health facilities designers.

## NATIONAL INSTITUTES OF HEALTH (NIH)

Provides leadership and direction to programs designed to improve the health of the people of the United States through the conduct and support of research (1) in the causes, diagnosis, prevention, and cure of diseases of man, (2) in the processes of human growth and development, (3) in the biological effects of environmental contaminants, and (4) in related science. NIH supports the training of research personnel, construction of research facilities, and the development of other research resources. It directs programs for the collection, dissemination, and exchange of information in medicine and health.

Engineering opportunities with the National Institutes of Health include those in the:

### A. DIVISION OF RESEARCH SERVICES . . . . . .

This division plans and conducts a centralized program of scientific, engineering and technical services in support of NIH activities;collaborates with research scientists in providing support during the planning, action, and report stages of research projects; and furnishes services and specialized assistance in the following areas: Biomedical engineering and instrumentation design and development; research animal production, care, procurement, and animal disease identification and control; centralized glassware, tissue culture, and media preparation and issuance; environmental health and safety, including evaluation of radiological hazards; and medical arts and photography.

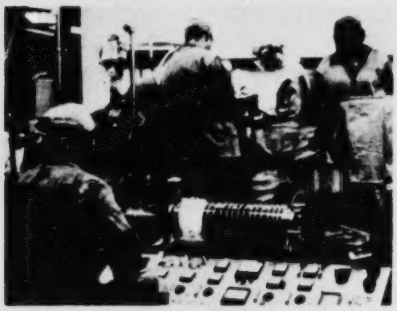
### B. DIVISION OF ENGINEERING SERVICES . . . . . .

This division plans and conducts a centralized program in support of the design, construction, operation, and maintenance of NIH facilities; provides engineering and architectural services in the planning of NIH facilities and improvements and the administration and inspection of NIH construction projects (contract); provides engineering craft and labor services in operating and maintaining NIH buildings, grounds, utility plants, and related equipment; and maintains liaison with State and local review/governing authorities.

### C. DIVISION OF COMPUTER RESEARCH AND TECHNOLOGY . . . . . .

This division has primary responsibility for incorporating the power of modern computers into the biomedical programs and administrative procedures of NIH. It also serves as a scientific and technological resource for other organizations in the PHS and related areas.

It plans and conducts research developmental and demonstration programs in mathematical and other computer-related sciences, including information processing, in support of NIH programs, and provides a professional and technical advisory resource in relevant areas of mathematics and other computer-related sciences.



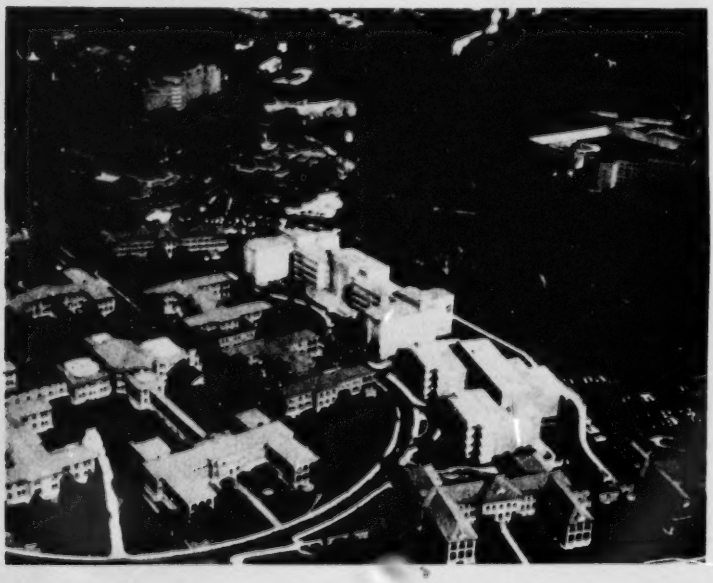
A biomedical engineer operates a heart-lung machine and monitors the patient's vital signs during an operation.

A DCRT computer operations center.

## ALCOHOL, DRUG ABUSE, AND MENTAL HEALTH ADMINISTRATION (ADAMHA)

Provides leadership in the Federal effort to reduce and eliminate, where possible, health problems that affect the people of the United States by the abuse of alcohol and drugs, and to improve the mental health of the people of the United States. This mission is accomplished through programs of research, manpower and services development, and information and education.

Engineering opportunities in the Alcohol, Drug Abuse, and Mental Health Administration are limited. A small number of engineers are employed by the National Institute of Mental Health, Division of Clinical and Community Services, Saint Elizabeths Hospital. Their principal responsibilities parallel those of the Division of Engineering Services of the National Institutes of Health, i.e., they conduct a centralized program in support of the construction, operation, and maintenance of Saint Elizabeths Hospital, which is located in Washington, D.C.

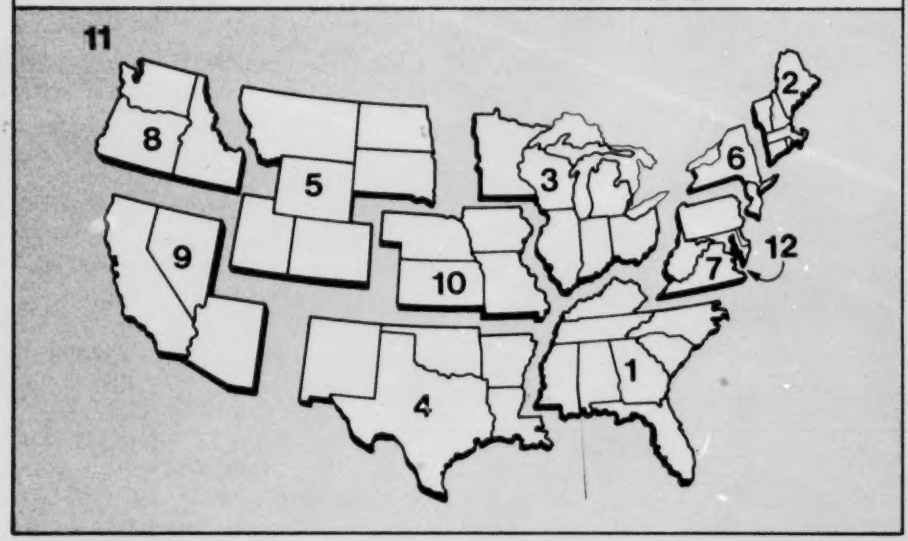


Saint Elizabeths Hospital Complex (East), Washington, D.C.

## — IN SUMMARY —

# A NATIONWIDE STAFF OF ENGINEERING PROFESSIONALS IS ENGAGED IN SUPPORTING THE PHS MISSION

## U.S. CIVIL SERVICE COMMISSION AREAS




| CSC AREA | 1 | | | | | | 2 | | | | | | 3 | | | | | | 4 | | | | | | 5 | | | | | | 6 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGENCY ➤ / ▼ CATEGORY | ADAMHA | CDC | FDA | HRA | HSA | NIH | ADAMHA | CDC | FDA | HRA | HSA | NIH | ADAMHA | CDC | FDA | HRA | HSA | NIH | ADAMHA | CDC | FDA | HRA | HSA | NIH | ADAMHA | CDC | FDA | HRA | HSA | NIH | ADAMHA | CDC | FDA | HRA | HSA | NIH |
| ARCHITECTURAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BIOMEDICAL | | | ● | | | | | | ● | | | | | ● | ● | | | | | | ● | | | | | | ● | | | | | | ● | | | |
| CHEMICAL | | | ● | | | ● | | | ● | | | | | ● | ● | | | | | | ● | | | | | | ● | | | | | | ● | | | |
| CIVIL/SANITARY | | ● | ● | | ● | ● | | | ● | | | ● | | ● | ● | | | ● | | | ● | | | ● | | | ● | | | ● | | | ● | | | ● |
| ELECTRICAL | | ● | ● | | | ● | | | ● | | | | | ● | ● | | | | | | ● | | | | | | ● | | | | | | ● | | | |
| ELECTRONIC | | ● | ● | | | | | | ● | | | | | ● | ● | | | | | | ● | | | ● | | | ● | | | | | | ● | | | |
| ENVIRONMENTAL | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | | | | | | | |
| GENERAL | | ● | ● | | | ● | | | ● | | | | | ● | ● | | | | | | ● | | | ● | | | ● | | | ● | | | ● | | | ● |
| INDUSTRIAL | | | ● | | | | | | ● | | | | | ● | ● | | | | | | ● | | | | | | ● | | | | | | ● | | | |
| MATERIAL | | | ● | | | | | | ● | | | | | ● | ● | | | | | | ● | | | | | | ● | | | | | | ● | | | |
| MECHANICAL | | ● | ● | | | ● | | | ● | | | | | ● | ● | | | | | | ● | | | ● | | | ● | | | ● | | | ● | | | ● |
| NUCLEAR | | | | | | | | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SYSTEMS | | ● | | | | | | | | | | | | ● | | | | | | | | | | ● | | | | | | | | | | | | |

| CSC AREA | 7 | | | | | | 8 | | | | | | 9 | | | | | | 10 | | | | | | 11 | | | | | | 12 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGENCY ➤ / ▼ CATEGORY | ADAMHA | CDC | FDA | HRA | HSA | NIH | ADAMHA | CDC | FDA | HRA | HSA | NIH | ADAMHA | CDC | FDA | HRA | HSA | NIH | ADAMHA | CDC | FDA | HRA | HSA | NIH | ADAMHA | CDC | FDA | HRA | HSA | NIH | ADAMHA | CDC | FDA | HRA | HSA | NIH |
| ARCHITECTURAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● | ● | ● |
| BIOMEDICAL | | ● | ● | | | | | | ● | | | | | ● | | | | | | | ● | | | | | | | | | | | ● | ● | | | ● |
| CHEMICAL | | ● | ● | | | | | | ● | | | | | ● | | | | | | | ● | | | | | | | | | | | | | | | ● |
| CIVIL/SANITARY | | ● | ● | | ● | | | | ● | | ● | | | ● | | ● | | | | | ● | | ● | | | | | ● | | | ● | ● | ● | ● | ● | ● |
| ELECTRICAL | | ● | ● | | | | | | ● | | | | | ● | | | | | | | ● | | | | | | | ● | | | ● | | ● | ● | | ● |
| ELECTRONIC | | ● | ● | | | | | | ● | | | | | ● | | | | | | | ● | | | | | | | | | | | ● | ● | | | ● |
| ENVIRONMENTAL | | ● | | | | | | | | | | | | | | ● | | | | | | | | | | | | | | | | ● | | | | ● |
| GENERAL | | ● | ● | | | | | | ● | | ● | | | ● | | ● | | | | | ● | | | | | | | ● | | | | ● | | | | ● |
| INDUSTRIAL | | ● | ● | | | | | | ● | | | | | ● | | | | | | | ● | | | | | | | | | | | ● | | | | ● |
| MATERIAL | | | ● | | | | | | ● | | | | | ● | | | | | | | ● | | | | | | | | | | | | | | | ● |
| MECHANICAL | | ● | ● | | | | | | ● | | ● | | | ● | | ● | | | | | ● | | | | | | | ● | | | | ● | ● | | ● | ● |
| NUCLEAR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | | ● |
| SYSTEMS | | ● | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ● | | ● | ● | | ● |

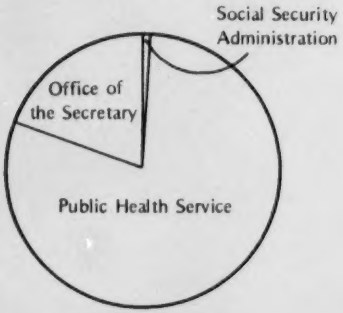
THIS MATRIX ILLUSTRATES THE VARIETY OF ENGINEERING SPECIALTIES UTILIZED (BY BOTH PHS EMPLOYMENT SYSTEMS) IN EACH CSC AREA.

DOT DENSITY IS NOT INDICATIVE OF STAFFING LEVEL

## ENGINEER UTILIZATION

Approximately one thousand graduate engineers are employed within the Department of Health, Education, and Welfare by the Office of the Secretary, DHEW, and by two of the principal operating components of DHEW, i.e., the Public Health Service, and the Social Security Administration. The engineering resources of the Department are distributed among its various operating components and their programs in proportions as depicted on this and the following page.

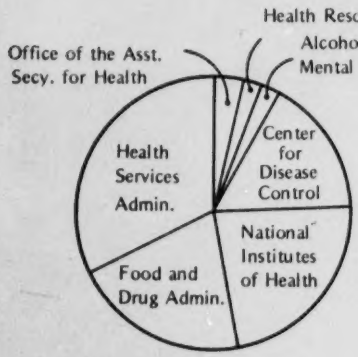
### DEPARTMENT OF HEALTH, EDUCATION, and WELFARE



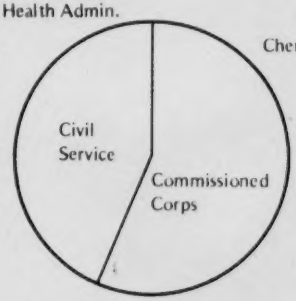

BY AGENCY

BY PERSONNEL SYSTEM

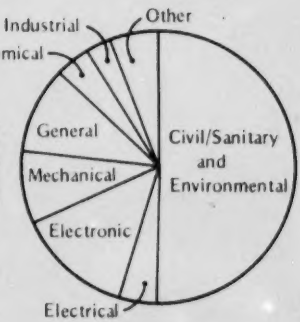
### PUBLIC HEALTH SERVICE


Office of the Asst. Secy. for Health
Health Resources Administration
Alcohol, Drug Abuse, and Mental Health Admin.
Health Services Admin.
Center for Disease Control
National Institutes of Health
Food and Drug Admin.

BY AGENCY*




BY PERSONNEL SYSTEM*

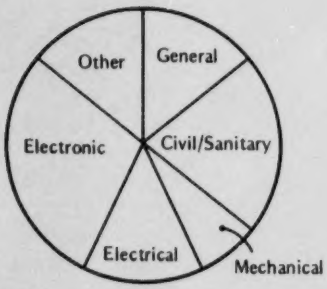



BY SPECIALTY*

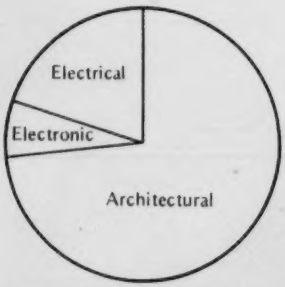
* Does not reflect over 200 commissioned officer engineers detailed to other DHEW agencies and to other federal agency programs.

## DISTRIBUTION BY ACADEMIC MAJOR OR CATEGORY OF SPECIALIZATION IN PRINCIPAL PUBLIC HEALTH SERVICE AGENCIES

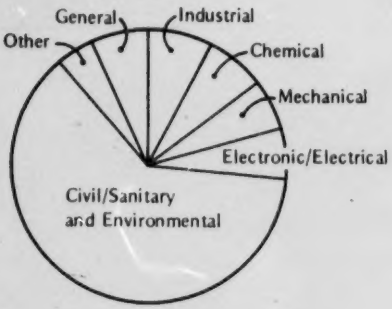
Approximate number of engineers employed as of 6/30/76 shown in parentheses below agency name.



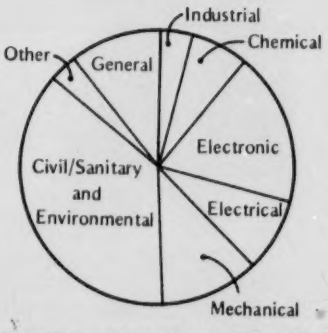

ALCOHOL, DRUG ABUSE, AND MENTAL HEALTH ADMINISTRATION
(14)



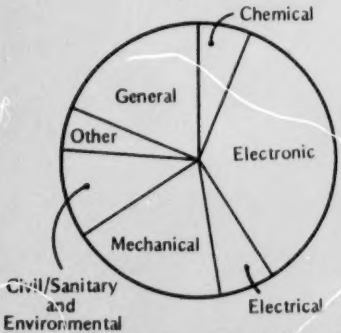

HEALTH RESOURCES ADMINISTRATION
(15)



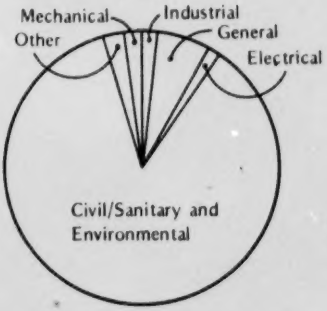

CENTER FOR DISEASE CONTROL
(103)




FOOD AND DRUG ADMINISTRATION
(128)




NATIONAL INSTITUTES OF HEALTH
(141)




HEALTH SERVICES ADMINISTRATION
(204)

## TWO EMPLOYMENT SYSTEMS.....

The Public Health Service operates a broad range of programs to carry out responsibilities placed upon it by Acts of Congress. For staffing purposes, PHS utilizes two employment systems..... Commissioned Corps and Civil Service. Operationally, health programs utilize a mix of both systems.

## COMMISSIONED CORPS SYSTEM

The Commissioned Corps is one of the seven uniformed services of the United States. Others are the Army, Navy, Marine Corps, Air Force, Coast Guard, and the Commissioned Officer Corps of the National Oceanic and Atmospheric Administration. Uniquely, the Corps is an all-officer organization of professionals in health-related fields.

GRADE and PAY: Grade is vested in the officer and retained upon assignment and during transfers among assignments (Rank in Man). Quarters and subsistance pay is not taxable. See Page 43 for pay tables.

MOBILITY: Subject to assignment wherever needed.

LEAVE: annual- - All officers earn 30 calendar days of leave per year. Maximum 60 days annual leave carryover from year to year.

sick- - Granted as needed.

RETIREMENT PLAN: Noncontributory (officer has nothing deducted from paycheck for retirement; however, officer does pay social security on taxable income).

RETIREMENT: Permissive between 20 and 30 years of creditable service. Voluntary at 30 years creditable service. Mandatory at age 64. Benefit limited to 75 percent highest base pay rate.

MEDICAL CARE: Noncontributory medical care coverage during active duty and retirement.

For further information about the Commissioned Corps, see CC Pamphlet Number 41, available by mailing the information request card on page 43.

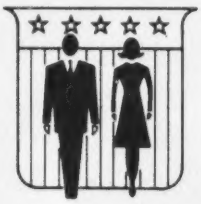
COMPARISON OF GRADES

| | PHS | NAVY | ARMY/ AIR FORCE | APPROX. EQUIV. CIV. SVC |
|---|---|---|---|---|
| 08 | SURG GEN[3] | REAR ADM[1] | MAJOR GEN | GS-17/18 |
| 07 | ASST SURG GEN | REAR ADM[2] | BRIG GEN | GS-16/17 |
| 06 | DIR | CAPT | COL | GS-15/16 |
| 05 | SR | CDR | LT COL | GS-13 |
| 04 | FULL | LT CDR | MAJOR | GS-12 |
| 03 | SR ASST | LT | CAPT | GS-11/12 |
| 02 | ASST | LT (JG) | 1ST LT | GS-09 |
| 01 | JR ASST | ENSIGN | 2ND LT | GS-07 |

1. Upper Half 2. Lower Half 3. Also Certain Asst Surg Gen's

For most positions, professionals may be appointed from either the Civil Service or the Commissioned Corps. Selection depends upon requirements of the job, availability of qualified personnel, applicant's employment system preference, and related factors.

## .....TWO EMPLOYMENT SYSTEMS



## CIVIL SERVICE SYSTEM

The Civil Service System is the Federal civilian (competitive) career system. More than 2,800,000 persons are employed, nationwide, under this personnel system. The majority of Civil Service positions are in the Executive Branch of government; that is, in agencies under the President's direction. Over 90 percent of all Federal positions fall under this system.

GRADE and PAY: Grade is vested in the position (Rank in Job). Employee receives basic pay only. Tax is paid on entire earnings. See Page 43 for current pay tables.

MOBILITY: Employee not generally subject to involuntary relocation (mobility restricted to positions acceptable to employee).

LEAVE: annual- - Leave earned is determined by years of service, i.e., 13 workdays per year during the first 3 years, 20 days up-to 15 years, 26 days for over 15 years. Unused leave may accumulate to 30 days.

sick- - 13 days per year granted. Unused sick leave may be accumulated indefinitely.

RETIREMENT PLAN: Contributory system (employee has 7 percent deducted from salary). Employee is not covered by social security.

RETIREMENT: Elective at age 62 and five years of creditable civilian service; age 60 and 20 years of creditable service; or age 55 with 30 years of creditable service, 5 of which must be civilian service. Mandatory at age 70 (with 15 years of service). Annuity limited to 80 percent of "High-3" average salary.

MEDICAL CARE: Contributory health insurance program.

For further information about the Civil Service system, see the publication, "Working for the USA," BRE 37, available from CSC area offices and Federal Job Information Centers.

## EMPLOYMENT QUALIFICATIONS

Engineers may enter the Public Health Service either by appointment to the Commissioned Corps or through the Civil Service system. The following minimum requirements apply for employment:

United States citizenship

Physical Eligibility

A Bachelor of Science degree in engineering in a curriculum accredited by the ECPD (Commissioned Corps)

A degree as described above or satisfaction of alternative conditions (Civil Service); see Announcement 424.

## PAY AND ALLOWANCES

Government policy is that salaries of Federal employees should be comparable to those paid by private employers for work at the same levels of difficulty and responsibility. Government salaries are reviewed frequently and changes are made as needed. Persons choosing careers in Government may expect, over the years, pay geared to the economy.

Civil Service personnel are paid, biweekly, at a rate consistent with their job rating and their longevity in Government service. Civil Service entry level for graduate engineers with no prior Government service is GS-5 or GS-7.

Commissioned personnel are paid monthly. Pay and allowances are based on rank, longevity, and dependency status. Only basic pay is taxable. Commissioned Corps entry level for graduate engineers with no prior Government service is Assistant Grade (02), Equivalent to Navy LT(jg).

See Supplemental Information section (page 43) for current Civil Service and Commissioned Corps pay scales.

## CAREER DEVELOPMENT AND TRAINING

The growth and development of all employees is essential for effective program operation and strong professional leadership. In this regard, the Public Health Service supports and encourages employee development through training, professional recognition, and career planning.

Federal agencies operate training programs to improve efficiency and economy of operations, to develop an experienced work force, and to help employees achieve their highest potential. Training and educational opportunities for PHS employees include: In-service training at PHS installations; training in other Federal agencies; and outside-the-service training in educational and other institutions.

It is a PHS policy that, within budgetary limitations, the service will support clinical, academic, technical, or managerial training at non-PHS training facilities, which will help the service meet its responsibilities and operate more effectively. Note: The Government Employees Training Act of 1958 places some restrictions on the training of Civil Service employees, i.e., employees are limited to one (in some cases two) years of training during a ten-year period, and are barred from receiving training during the first year of their appointment. Commissioned Corps officers are not affected by these restrictions.

Under the PHS Career Development Program career development committees for most categories of health professions, including engineers, have been established. These committees counsel individuals on career development patterns and goals, recommend assignments essential for well rounded experience in line with career goals, and monitor career progress. The committees also assist in the coordination of efforts within the PHS to insure that career development programs meet the objectives of the individual and the Service.

## COMMISSIONED CORPS

Applications for active duty for extended periods of time will be accepted at any time during the year. Applicants should submit their applications as early as possible, ideally six months prior to their availability date. The added lead time permits thorough canvassing of programs for personnel requirements over a longer period of time and improves the chances for employment. Applications for "short-term" duty under the COSTEP program must be received by the Commissioned Personnel Operations Division by specified dates, depending on the timing of the desired active duty assignment. Application deadlines are specified in the booklet entitled "Commissioned Officer Student Training and Extern Program," CCPM Pamphlet No. 9. Copies of this pamphlet and application packets for both extended active duty and COSTEP assignments are available from the PHS Office of Personnel (see Page 43 for information request card or Page 2 for address).

Applicants should complete all forms in the application packet and forward them, along with appropriate attachments, to the Commissioned Personnel Operations Division, USPHS. They will be advised of when and where to report for their oral interview and physical examination.

Applicants should keep the Commissioned Personnel Operations Division advised of address and/or telephone number changes for as long as they maintain an interest in PHS employment. This is particularly crucial following completion of the academic year when many applicants depart from the vicinity of their university. If an applicant's interest in PHS employment ceases to exist for any reason whatsoever, the PHS Office of Personnel should be notified immediately.

## CIVIL SERVICE

Opportunities to apply for Civil Service positions in Engineering, Physical and Mathematical Sciences, and Related Professions are "announced" by the Civil Service Commission in one nationwide announcement (Number 424), which can be obtained from any Civil Service Commission area office or Federal Job Information Center. In general, applications are accepted by all area offices for all such professions at all times. Periodically, applications are not accepted for employment of specific occupational categories in a given area office. Notice to that effect is given by amendment to the basic announcement.

For positions graded GS-5 and GS-7, applications are reviewed and the applicants are assigned a numerical rating and referred in the order of their standing on a list of eligibles, to any hiring Federal agency within the area office's geographical limits. For grades GS-9 and above, applications are reviewed as vacancies occur. The applicant's qualifications are compared with the specific requirements of the position to determine the order of referral. For this reason, it is extremely important to complete the SF-171 as specifically as possible to ensure consideration for highly specialized positions.

For employment under the Civil Service system, a separate Civil Service application (form SF-171, etc.) must be sent to each Civil Service area office having jurisdiction over each of the geographic locations where the applicant is interested in working. Applicants will not be considered for employment in locations where they have not specifically indicated their desire to work by filing an application with the appropriate area office.

Applicants especially interested in employment with the Public Health Service through the Civil Service system are advised to send a copy of their completed CSC application (SF-171) and a grade transcript to the Office of the Chief Engineer, Public Health Service (address on page 43). Each application received will be forwarded to the health agency for which the applicant indicates an interest in working. NOTE: An applicant must still be included on the Civil Service Commission's list of eligibles to be hired by any health agency.

College seniors or graduate students may file applications for employment prior to completing all their scholastic requirements, provided the applicant expects to complete such requirements within nine months of the date the application is filed. An appointment may be offered, but the applicant may not enter on duty until successful completion of all required coursework.

Applicants continue to receive consideration for appointment for a period of one year unless removed from consideration due to acceptance of a position, failure to reply to official correspondence, or for other reasons.

THE MEN AND WOMEN OF THE PUBLIC HEALTH SERVICE LOOK FORWARD TO WELCOMING YOU AS A COLLEAGUE IN THEIR ENDEAVOR TO PROTECT AND IMPROVE THE HEALTH OF THE NATION – AND THE WORLD.

SUPPLEMENTAL INFORMATION

- ☐ RECRUITMENT LITERATURE
- ☐ PAY SCHEDULES
- ☐ EMPLOYMENT APPLICATIONS